

# **Research on the Design and Application of Digital Creative Products of Intangible Cultural Heritage Based on the Theory of the Flow**

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**Abstract:** To optimize the cultural experience of users in using digital creative products of intangible cultural heritage and enhance the promotion of intangible cultural heritage projects, this paper proposes a corresponding product design method based on the Flow theory. Taking the factors of the Flow theory as the starting point, this paper combines the user experience process corresponding to the use scenario of NRM digital creative products, from which the Flow journey diagram of general users in the NRM experience is summarized and optimized, and the specific design solution process is constructed in this way. This paper introduces the Flow theory to NRM. And this paper introduces the Flow theory into the design and application of digital creative products of intangible cultural heritage, to improve the immersion experience of existing digital creative products of intangible cultural heritage, enhance the bond between users and intangible cultural heritage, and also provide theoretical and practical references for the preservation and innovative transformation of intangible cultural heritage.

**Keywords:** The Flow theory, digital creative products, intangible cultural heritage, cultural experience

## **1. Introduction**

The new generation of the Internet and digital technology revolution continues to advance, creating a bite-sized era for modern society, while also promoting the development of various fields and influencing the way people produce and live. In particular, the advent of the digital age has opened up more possibilities for innovative ways of preserving and passing on intangible cultural heritage (hereinafter referred to as "ICH"), and digital creative products are the product of close integration with traditional culture, especially ICH, and are attracting public attention. The good or bad design of the related products in the user experience has a direct impact on their overall quality. Therefore, how to meet the general needs of these products, based on how to make the users continue to increase their attention and enthusiasm in the process of experience, to achieve a state of self-spiritual satisfaction and enhance the sense of pleasure to reach the state of "the Flow", has become The product designers need to explore this issue in depth.

## 2. Overview of research on the mind-flow theory and digital creative products

The concept of Flow was first introduced by the American psychologist Mihaly Csikszentmihalyi and is defined as a state of forgetfulness in which a person engages in an activity that produces a high level of satisfaction and total immersion in the satisfaction and excitement of the activity.[1] Such a state of feeling is what the re-experience category is all about. Such a state of feeling is what is sought after by experience-based cultural and creative products. As in 2017, the Forbidden City immersive interactive tour created by the Forbidden City with the help of VR virtual reality technology, users were able to break through the limitations of time and space in this virtual experience, walking through history, viewing and touching digital scenes, fully immersing themselves in this reconstructed historical story. For cultural products with an emphasis on experience, there is a constant search for ways to enhance the user's product to a better state of experience. Mihaly Csikszentmihalyi considers a complete set of mindstream experiences to include nine characteristics such as 'clarity of purpose', 'timely feedback on behavioural payoffs', and 'balance of challenge and competence' (see Figure 1) Donna L. Hoffman and Thomas P. Novak later built on the nine characteristics by grouping them into three main factors: conditions, experiences, and outcomes.[2] The three factors are condition, experience, and outcome. Of these, the conditional factors include clarity of purpose, timely feedback on behavioural payoffs, and a balance between challenge and competence, which are necessary prerequisites for the formation of mindful flow experiences. (See Figure 1)

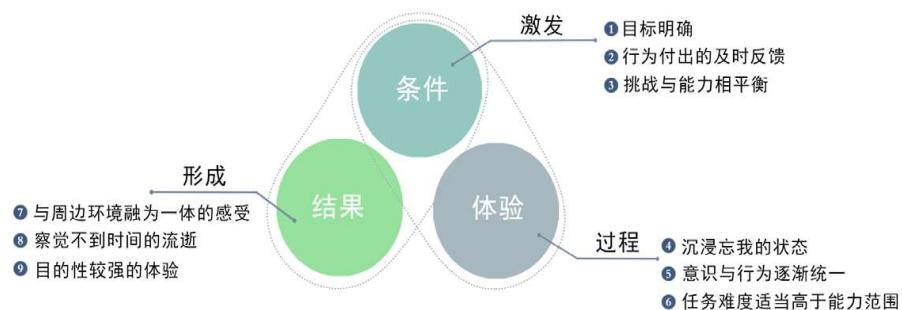


Figure 1 The three main factors and key features that shape the heart flow experience

The Flow theory is widely used in psychology, but also in the Internet, management, consumer behaviour and other areas.[3] In China, research on mind-flow theory has gradually expanded from software applications and education to interaction design, games and other areas. In China, research on mind-flow theory has gradually expanded from software applications and education to interaction design, game development and cultural and creative product design, and has gradually become the

theoretical basis for optimising user experience in this field. In "Research on the interaction design of cultural and creative products based on the theory of the Flow", Li Jiangyong et al. take the practice of Nangyue Buddhism Road cultural and creative product design as an example to verify the feasibility of the design method based on the theory of the Flow[4]. Gu Yi and Xu Wangxuyu proposed that based on the the Flow, not only should we focus on the overall completion of digital cultural and creative products, but also on how to make users achieve a state of immersive cultural experience in the process of using the products.[5] . Cao Kaiyi and Xu Chen improved the promotion method of "Kunqu Shuban" with the intervention of the Flow theory, and used the HTML5 format to provide users with a better cultural experience.[6] This is an example of how the flow theory has been widely applied to the promotion of Kunqu Opera. This shows that the Flow theory has been widely applied in various fields, and it is also being integrated and expanded with cultural creative products and digital creative products.

Digital creative products for intangible cultural heritage are a new form of cultural expression that has emerged as a result of the digital empowerment of traditional culture. In recent years, the development trend of digital creative products has been on the rise, such as the "Daily Palace" launched by the Palace Museum; the "Cloud Tour of Dunhuang" and "Digital Donor" launched by the Dunhuang Research Institute, etc. However, the overall research is still in the exploratory stage, especially for intangible cultural heritage digital creative products. "The cultural connotations behind NRMs have not been fully explored, and some of the early products lack holistic thinking and construction of user experience needs, making it difficult for users to Some of the products that emerged in the early days lacked holistic thinking and construction of user experience needs, making it difficult for users to generate a continuous immersive cultural experience. Therefore, digital creative products need more appropriate experience theories to guide their design.

### **3. The role of the Flow theory in the design of digital creative products of intangible cultural heritage**

Due to its intertwined cultural threads and rich cultural connotations, NRM constitutes a huge cultural ecological system. The digital era provides greater scope for the development of this system, and digital creative products of NRMs also play the role of a medium for the protection and rational use of NRM cultural resources and the promotion of the spirit of NRM culture. Therefore, such products should not only pay attention to the embodiment of the characteristics of their NRM culture genes but also to the good immersive cultural experience that users can have in using the products. The introduction of the Flow theory in the design of NRM digital creative products is intended to strengthen the products' ability to guide users into an immersive state, enhance their cultural experience, and thus complete the subtle transmission and dissemination of NRM. The core needs of non-heritage digital creative products for the general public can be found more precisely, and the conditions for the formation of the Flow can be integrated and applied to design creative products that enhance the user's experience according to the strong needs. It is conducive to accurately grasping the redesign of cultural elements, enhancing the immersion of intangible cultural heritage experiences, enriching the intangible cultural heritage cultural characteristics of different regions, and giving

new vitality while achieving the purpose of digitally empowering excellent traditional culture and promoting its innovative development.

#### 4. Approaches to the design of intangible cultural heritage digital creative products under the Flow theory

The cultural experience of intangible cultural heritage digital creative products is achieved through a process of progressive interpretation of the product's image, features and understanding of the deeper meaning behind it, and then a connection to culture.[7] The formation of a mindstream is a sequential process. The formation of the mindstream is a gradual process in which the conditions that stimulate the formation of the mindstream play a crucial role. These include: firstly, a clear goal to motivate the user, secondly, timely feedback on behavioural payoffs to stimulate interest, and thirdly, a balance between challenge and ability to create a state of immersion, all three of which are incremental and ultimately motivate the user. We have therefore incorporated the key factors that stimulate mind-flow into our approach to intangible cultural heritage digital creative product design to optimise and enhance the user experience of cultural products. We usually divide the product experience process into three main stages: before, during and after the product is used (see Figure 2). Before using a product, users will use a variety of ways to understand the product according to their own needs, and will unconsciously compare similar products, at this time, a product that can accurately align with the user experience needs will take the lead, this is the first step in the formation of the Flow: a clear goal. Only when the user's initial needs are met and they can interpret the product content and understand the cultural implications behind it, will they enter a state of immersion in the mindstream. In the latter stages of product use, users usually evaluate the product based on their sense of experience. If the experience is good, the user will become dependent on the product and use it again and again. It is by placing the three conditional factors of the mindstream theory into the three stages of the use of a intangible cultural heritage digital creative product that our design is completed.

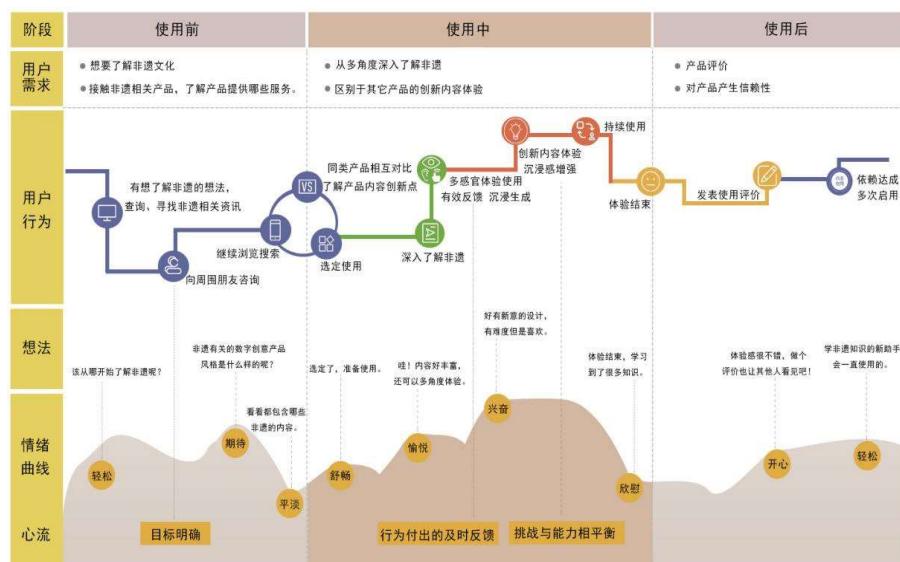


Figure 2 A journey through the mindstream of users of digital creative products in the intangible cultural heritage category

#### 4.1 Constructing user motivation for product experience behaviour through clear goals

Chekhsenmikhali has described how, in the ongoing research of the Flow theory, it has been found that users with a particular environment are more likely to have a mind-flow experience[8]. The premise of creating a 'specific environment' is to understand the 'specific needs of the user. The prerequisite for creating a 'specific environment' is to understand the 'specific needs of the user. According to motivation theory, the clearer and more actionable the goals set, the more motivated the user will be.[9] The more clear and actionable the goal is, the higher the motivation will be. Specifically, while designers used to focus on "what kind of people the users are" in the early stages of design, the mindstream theory is more concerned with "what the users want" in the design of digital creative products. Therefore, in the design of intangible cultural heritage digital creative products, after understanding the specific cultural needs of users, a clear and explicit experience goal can be constructed for users, specifically from the construction of a clear and reasonable content framework and simple and visual interface design.

An intuitive, clear and reasonable product content framework system helps users to quickly receive the cultural symbolism conveyed by the product and achieve their goals efficiently and quickly. Take the traditional folk mortise and tenon craft-based digital creative product "Crafting Wood" as an example, it mainly sets up four modules: "Cultivation, Collection, Consultation and Achievement", and connects each module with the user's mindstream journey, so that the experience is progressive (see Figure 3). The clear and logical content framework keeps users interested in exploring Craftsman Wood and immersing themselves in the traditional folk craft experience it creates. The NRM culture is complex, and without a clear and reasonable framework in the design of the content layers of its digital creative products, it will quickly reduce users' interest in the experience. Therefore, the core points should be highlighted in the content distribution design, with the key or commonly used functions placed in prominent areas to optimise the operation process. Ensure that users can move smoothly to the next area after completing the operation of one area so that they can focus fully on the target and thus gradually trigger the Flow.

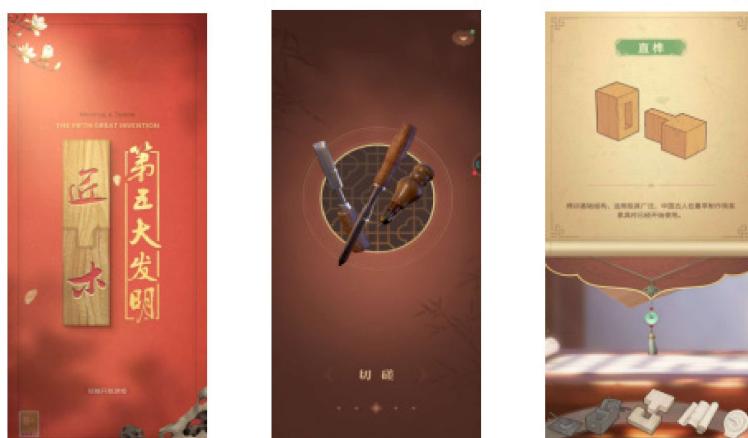


Figure 3 Case: Digital Creative Product "Artisan Wood"

The interface of a digital creative product is the first visual representation of its content. A simple and orderly interface can enhance the user's interest in the experience while quickly understanding the product, and guide the user to gradually immerse himself in it. In the process of designing digital creative products for non-foreign heritage, the first thing to do is to strengthen the transmission of the main information of non-foreign heritage, so that the overall visual effect is unified and the key elements of the interface design are extracted from the non-foreign heritage itself, making the product as a whole more colourful in terms of non-foreign heritage culture. In addition, the main message of the NRM is expressed through its unique colours, shapes, patterns and other morphological features. Secondly, compared to the traditional textual presentation, the visual presentation in the form of simple images is more in line with the current reading habits of the public and more easily accepted by users, helping them to gain a continuous mind-flow experience.

#### 4.2 Boosting user interest through systematic feedback incentives

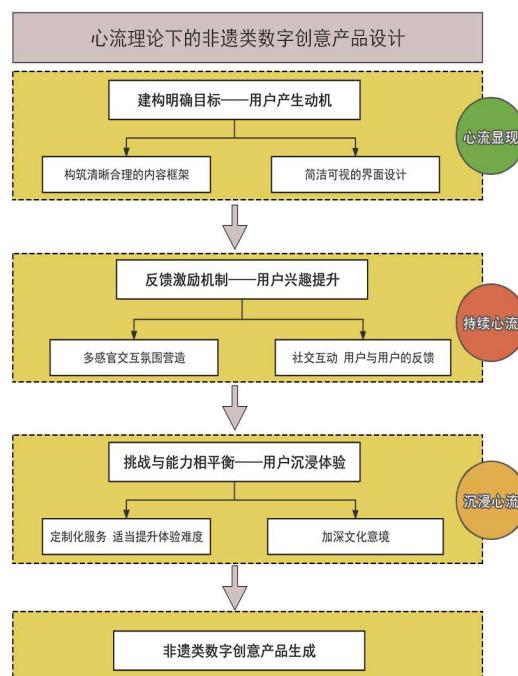
"Feedback" is the "reward" for the "effort" of user interaction, and getting good feedback when the user completes the interaction is a key to improving the user experience. Digital creative products of non-foreign heritage need to establish an emotional connection between users and culture through effective feedback in many aspects, thus triggering cultural identity and leading users to feel the cultural temperature through immersion. Designers can therefore create a feedback incentive mechanism in terms of multi-sensory interaction and social interaction (user to user) to enhance user interest and stabilise the state of the Flow.

The new technologies of the Internet era are gradually being applied to the design of digital creative products, and single-sensory feedback products are gradually being replaced by multi-sensory feedback design. The combination of multi-sensory interactive feedback creates an atmosphere where the charm of NRM culture is perceived holistically from different perspectives, improving the user's sense of boredom when receiving cultural information. The emergence of social media has fundamentally changed the way users communicate with each other. There is a growing tendency for people to share and connect on open social platforms, which is user-to-user feedback. Social platforms are built with human design, and human design is an important way to improve the user experience.[10] This is an important way to improve the user experience. In the design of digital creative products for NRM, a "social interaction platform" module is set up, where users can see NRM-related content posted by other users in the interaction area, or they can post it themselves, and the system can even automatically push the content of interest to users to attract more users to tell NRM stories, thus building the future of NRM.

#### 4.3 Balancing challenge and competence to stimulate the user immersion experience

A balance between challenge and ability is necessary to further promote a state of mind-flow immersion, and if there is a mismatch between the two, the user is at risk of disrupting the mind-flow at any time. Therefore, the design of the challenge difficulty of intangible cultural heritage digital creative products should focus on minimising user frustration and appropriately enhancing the sense

of achievement. Specifically, a dynamic adjustment mechanism of the challenge level can be set in the product to ensure that the output of different users' abilities at different stages of the product matches the challenge level, to accelerate the generation of immersive cultural experiences for users. In the past, most of the digital creative products in the intangible cultural heritage category only stayed at the shallow level of simple science and technology of intangible cultural heritage skills, which is the lowest level of challenge in these products, and too many simple and shallow layers of content led to a lower interest of users in the experience. Therefore, it is necessary to introduce an appropriate level of challenge to the product and to enhance the cultural context of the product. The product must meet the individual needs of the user to immerse them in the mindstream. For example, by applying the strong participation concept of user creation (DIY) to the design of intangible cultural heritage digital creative products, users are deeply involved in the secondary creation of intangible cultural heritage products, thus helping them to immerse themselves in the target situation of completing the creation, and ensuring the possibility of repeated participation in the production, while introducing a dynamic adjustment mechanism of difficulty in the product to meet their psychological expectations and the challenge of open-ended results. The product also introduces a dynamic difficulty adjustment mechanism to meet users' psychological expectations and their attempts at open-ended results, from stimulating the user's immersion experience to deepening their understanding of the cultural context of intangible cultural heritage.



*Figure 4 Mindstream-guided digital creative product design process for intangible cultural heritage*

To sum up, the systematic design method of non-legacy digital creative products based on the characteristics of conditional factors in flow theory, three key nodes of flow appearance-continuous flow-immersion are required to run through the whole design process (figure 4). Through the flow layer-by-layer evolution as a guide to all stages of design practice, to ensure the production of non-

legacy digital creative products in line with the flow experience.

## 5. Digital Creative Product Design Practice for the intangible cultural heritage "Lacquer Art"

Based on the method of designing digital creative products of intangible cultural heritage based on the Flow theory, this paper selects Guangxi intangible cultural heritage Guilin lacquerware as the object of design practice and designs a Guilin lacquerware digital creative product - "Lacquer Art" mobile platform application.

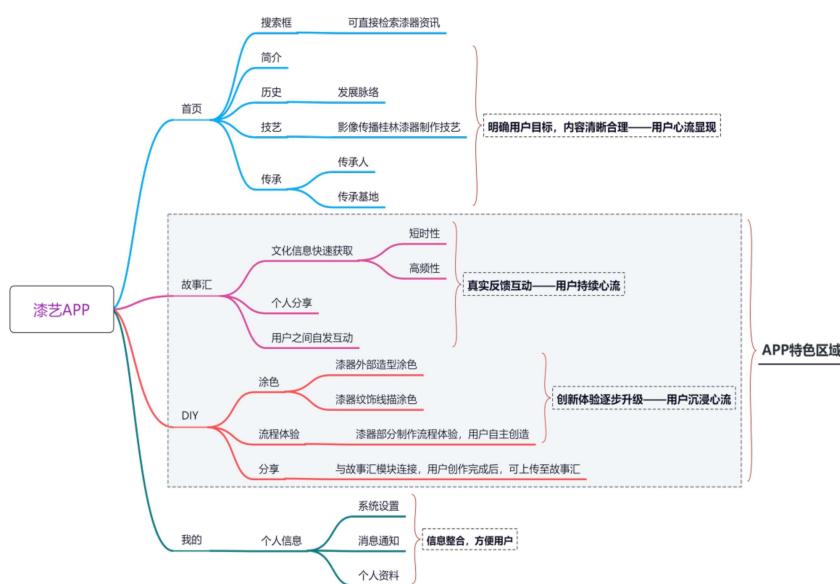


Figure 5 Design framework for the mobile digital creative product mindstream of "Lacquer"

Firstly, based on users' intrinsic need for curiosity and love of intangible cultural heritage skills, the digital creative product "Lacquer Art" has a clear and reasonable content framework and a simple and easy-to-read design concept based on the overall content structure. The content design is divided into three main content modules, namely "Home", "Story" and "DIY", based on the flow of users' desire to learn about intangible cultural heritage skills, and The "My" personal information module (see Figure 5). These settings correspond to the manifestation of the mindstream, the user's continuous mindstream and the immersion mindstream respectively. The home page module is a highly organised and content-rich module with a high level of information on lacquer culture and is set up to facilitate user access. The module's highly integrated cultural information is designed to provide users with efficient access to cultural information in a fragmented time, avoiding the phenomenon of users losing interest in reading because they are unable to understand cultural content in-depth, and effectively guiding users into the mindstream journey. By enhancing the multi-dimensional interaction in the 'Storytelling' module into a socially interactive experience, users can continue their

the Flow. The "DIY" module is set up as a fun creative experience, thus guiding users to participate in different modules of their immersion, to regulate the user's fatigue after a single module reading experience; finally, emphasising the user's sense of belonging and identity, by setting up "My Finally, it emphasises the sense of belonging and identity of the user by setting up a "My" personal module to build a personalised information space for the user. The product's colour scheme highlights the deep, ancient impression of traditional lacquerware techniques, choosing a stable and deep red-brown colour to match it, while using a red-brown colour scheme and white to match the design, making the overall layout of the interface simple (see Figure 6), guiding users to gradually delve into the content experience in terms of visual senses.

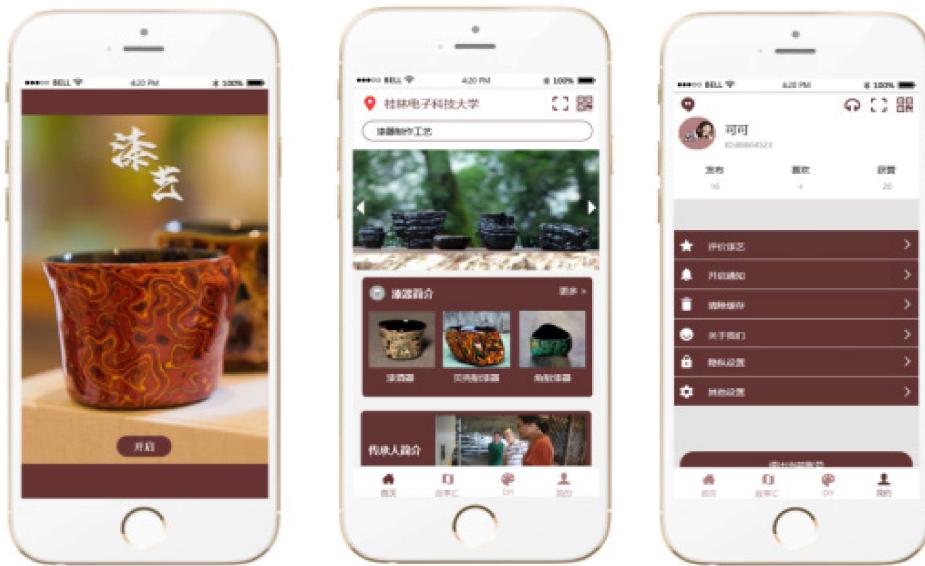


Figure 6 The main page design display of the digital creative product "Lacquer" (part)

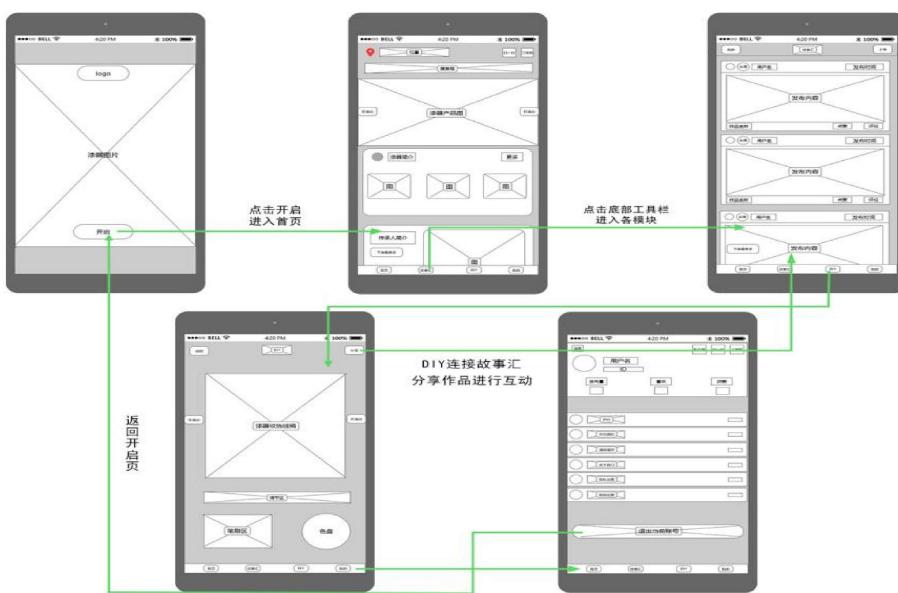


Fig. 7 Interactive prototype of the digital creative product "Lacquer" (a few parts)

Secondly, the interactive feedback level of the "lacquer art" APP, follows the design concept of a multi-sensory interaction atmosphere and feedback between users and users. One is to transmit the most accurate cultural information by setting a concise form of multi-sensory interactive feedback. In the "Story Collection" module, the playback of short videos can design on-screen comments and click sound effects to give users visual and auditory feedback; when users click on specific elements of the interface, slight motor vibration gives real-time tactile feedback. the above multi-sensory interactive feedback is an incentive to user behaviour to eliminate fatigue in the early stage of user experience and stimulate users' willingness to explore. Second, by opening comments, forwarding, private message sharing and other functions in the social interaction zone, users can receive feedback from other users anytime and anywhere while quickly understanding intangible cultural heritage cultural information. This kind of real feedback is a powerful driving force for users' continuous flow. "Lacquer Art" product interaction prototype and product page display (see figure 7, 8).

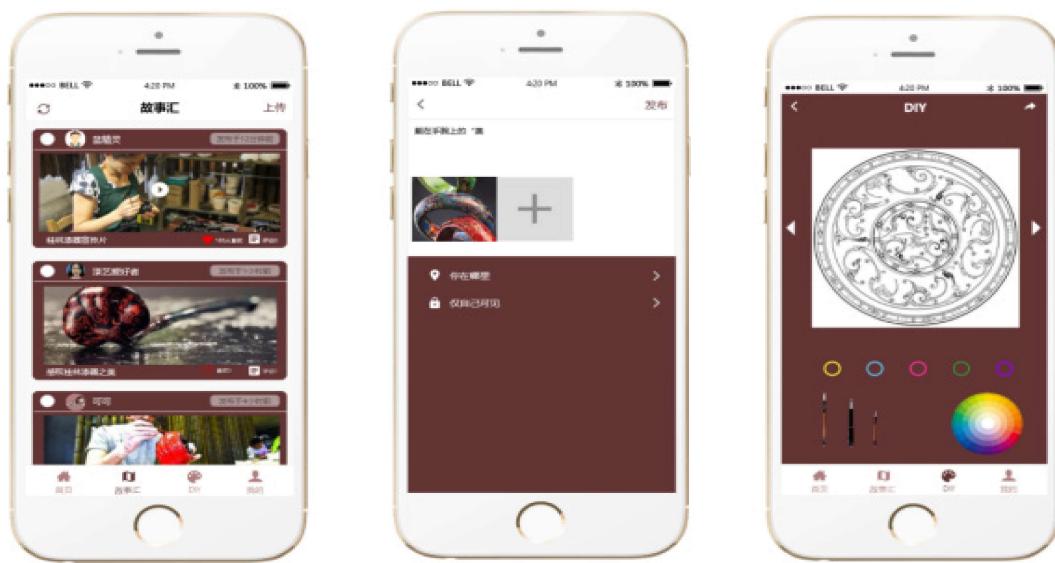


Figure 8 Display of the content page of the digital creative product "Lacquer Art"

Finally, the product's in-depth experience level is set to follow the concept of guiding the user through an immersive engagement and deepening the cultural context. A DIY interactive experience area has been set up for users. There are two main types of experience: (1) First experience of the technique. Based on the customised lacquerware shapes and decorative line drawings provided by the product, users can independently experience the traditional skills of painting; (2) personalised experience. After completing the colouring experience, users can experience the production process of Guilin lacquerware in-depth and create their virtual lacquerware crafts. The difficulty of the module is dynamically adjusted by the product system and independently selected by the user to meet the experience needs of different users. At the same time, in terms of cultural context perception, the overall style and sound of the product are based on the elegant and ancient impression of traditional lacquerware, and the design of each functional module does not depart from the simple and heavy historical impression, precisely through the style features to deepen the user's context perception.

when using the product, thus allowing people to gain an immersive experience of intangible cultural heritage culture.

## 5. Product effectiveness verification

The digital creative product "Lacquer" is validated through the application of prototyping tools to complete the application validation and testing of product functionality, interface, interaction, user experience and other aspects. The target audience of this validation is mainly young people. The young generation is the main force of intangible cultural heritage and is also the main target group of digital creative products. Through research and interviews with users, the product was evaluated as follows: the product interface is reasonably divided, the interaction logic structure is clear, and it can quickly help users understand lacquerware culture information, and the initial formation of the Flow; in terms of product features, the social interaction feedback of the storytelling module enhances users' interest, and at the same time allows users to obtain more interesting and practical information about intangible cultural heritage through communication with others, and the product viscosity is The DIY module can promote users' sense of achievement and help them enter an immersive state of mind-flow. This digital creative product of intangible cultural heritage has a good usage experience and can make users feel immersed in the culture.

## 6. Concluding

The digital era has given the intangible cultural heritage the possibility of multi-dimensional development, empowering traditional cultures with new technologies. Digital creative products are presented to the public precisely as the new form of the digital twin of intangible cultural heritage, with broad development prospects. This paper explores the design methods of digital creative products for NRMs through the analysis of the Flow demand journey and specific design cases and uses the Flow theory to guide the design practice of Guilin lacquerware digital creative products, which have achieved a better immersive cultural experience, which also opens up new ideas for the design and promotion of digital NRM-related products.

## Funding

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## References

- [1] CSEIKSZENTMIHALY, I., & MIHAL, Y. (1990). *Flow: the Psychology of Optimal Experience*. New York: Harper & Row.
- [2] NOVAK, T. P., HOFFMAN, D. L., & YUNG, Y. F. (2000). Measuring the Customer Experience in Online Environments: A Structural Modeling Approach. *Marketing Science*, 19(1), 22-42.
- [3] Chen, X. (2014). The mind flow experience and its research status. *Journal of Jiangsu Normal University (Philosophy and Social Science Edition)*, 40(05), 150-155.
- [4] Li, J. Y., Tan, Q. X., Qiu, P., Zhang, W., & Li, Z. X. (2020). Research on the interaction design of cultural and creative products based on the Flow theory. *Packaging Engineering*, 41(18), 287-293.
- [5] Gu, Y., & Xu, W. X. Y. (2022). Digital cultural and creative product design of Haipai painting based on the Flow theory. *Packaging Engineering*, 43(04), 383-391.
- [6] Cao, K. Y., & Xu, C. (2021). Digital cultural and creative product design of "ten parts of Kunqu Opera " is based on the theory of the Flow. *Industrial Design*, (12), 146-147.
- [7] Guo, Z. Q., & Niu, L. Y. (2018). Cultural and creative product design based on sense-quality experience. *Packaging Engineering*, 39(10), 96-100.
- [8] Liu, J., & Peng, L. (2018). Immersive VR tourism product design based on the Flow theory. *Design*, No.298(19), 136-138.
- [9] Qiang, K. H., & Ren, K. H. (2018). Research on the interaction design of mobile learning applications based on the Flow theory. *Packaging Engineering*, 39(04), 188-192.
- [10] Long, J. J. (2016). Research on the interaction design of sports and fitness apps from the perspective of the Flow theory experience. *Decoration*, (08), 138-139.
- [11] Wu, L. (2017). Pain point analysis of intangible cultural heritage APP based on UCD perspective. *Publishing Guangjiao*, (09), 60-62.
- [12] LI F. (2018). Research on Elderly Optimization Design of Online Mahjong Game Based on The Flow Theory. *Innovation in Aging*, 2(suppl\_1), 221-221.
- [13] KEDA WANG. (2021). Research on Interaction Design of Word Memory APP Based on Flow Theory. *Proceedings of International Conference on Artistic Design, Communication and Engineering Science*, 2021, 836-843.
- [14] CHUN-CHIN CHIU AND HAO-ERL YANG. (2015). The Impact Of Website Design Features On Behavioral Intentions. *International Journal of Scientific & Technology Research*, 4(8), 71-78.
- [15] JAE-WON CHOI AND DAVID WOOK KOH. (2014). Learning Game Flow Theory through Media Psychology Education. *Journal of The Korean Society for Computer Game*, 27(3), 17-26.